CIRM IP Policies, Commercial Firms, and Realizing the Promise of Prop 71

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Invitrogen & Research Tools

- Leader in a $17B*, fast growing, research tools industry -- much of it located in California.
- Nearly 1500 employees in CA & growing
  - Headquarters, manufacturing, and R&D
  - Carlsbad, Camarillo
- 15,000+ products sold predominantly into the research market
  - Readily available without bias to government, academic, and commercial researchers
  - Most products can be purchased on website: www.invitrogen.com
  - Bring value to the research and drug discovery process
    - Speed, Ease, Reproducibility, Cost, Reduced Environmental Waste
- Hundreds of patents
  - Some on readily reproducible products
- A major licensee of research tool IP from universities, globally
  - More than 40 new licenses executed annually

*Source Lehman

A Major Commitment to Stem Cell Research

- Created a Business Venture focused on the needs of Stem Cell Research
- Hired Mahendra Rao, from NIH/ NIA to head IVGN Stem Cell R&D
- Over 20 researchers dedicated to Stem Cell Research within IVGN
- Leverage the research depth across IVGN to enable stem cell technology platforms – 600+ researchers company wide
- Active Participant in the Stem Cell Community
  - Support a number of stem cell courses worldwide
  - Mahendra Rao, has personally taught several of NIH stem cell courses
  - Invitrogen products specified in 90% of NIH Stem Cell protocols

Stem Cell Research Workflow

- Isolate individual stem cell populations
- Ensure that cells retain their functionality and potential to differentiate

- Characterize & track stem cell populations
- Ensure that cells are “transplant” ready

- Culture stem cell lines in a stable, multi- or pluri-potent state, free from mutations & to sufficient quantity
- Enable Economical expansion to make cell-therapy a reality

- Control & activate stem cell differentiation to desired lineages
- Functionally active differentiated cells

Clear workflow elements – bench to bedside

Enabling Stem Cell Research

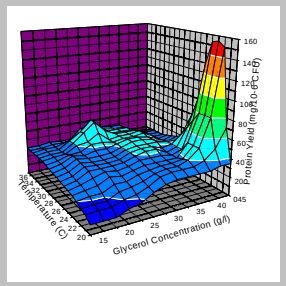
- Primary antibodies
- Bead-based cell separation systems
- Labeling and detection
- Protein purification & analysis tools
- DNA/ RNA based characterization
- Services

- Stem Cell culture media and reagents
- Growth factors and cytokines
- Gene regulation in stem cells
- In vitro/ in vivo cell tracking
- Services

Several key technology platforms need to be developed

Enabling Platforms for Stem Cell Therapy

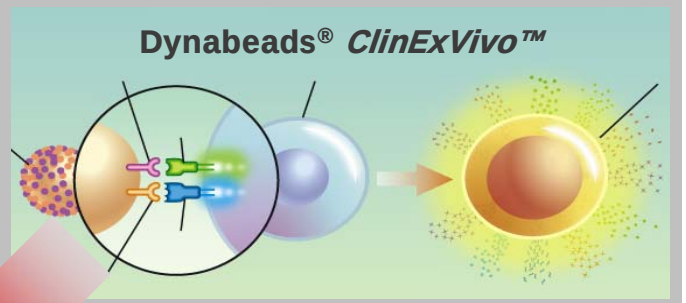
Economic Production of Large Quantities of Cells



Optimized media

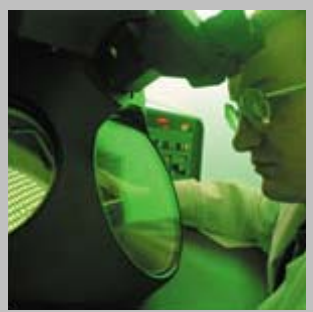
Process development

Isolation of Differentiated / Desired Cell Types



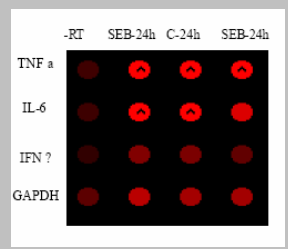
Research tools

Batch Release Testing



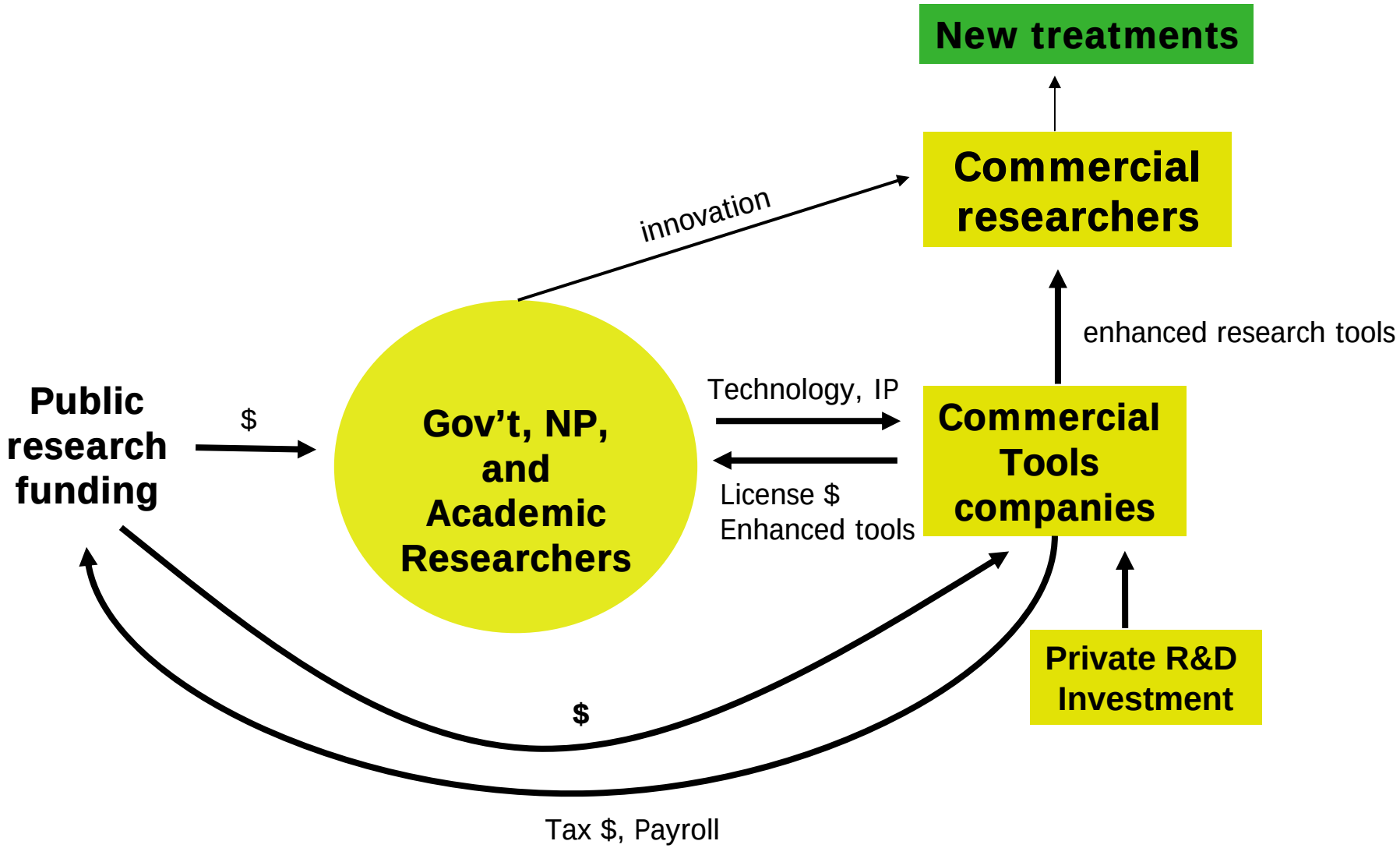
- Sterility/mycoplasma
- General safety
- Tumorogenicity
- Adventitious agents
- Novel cell-based test

Cell Banking / Characterization



Research tools will play an important role in Cell Therapy

Research Tool Innovation Cycle



Licensing of technologies key to value creation and treatments

Grant and Research Contract Experience

- Companies typically seek government research grants to pursue:
  - Research they cannot fund or fund right now
  - Research beyond their risk profile
  - Research leading to product where the government is the customer
  - Research involving interesting partners or requiring a group of participants
- Invitrogen Corp has not traditionally sought research grants
- Do have research contracts with some government agencies
  - Companies bring a combination of technical and commercialization expertise… often ideal if goal is to get research to market as soon as possible.
- Our acquisitions occasionally have had SBIR or US Commerce Department Advanced Technology Program (ATP) grants.
- In both contracts and inherited grants, the usual IP arrangement is that the company owns the IP and the Government retains a government use license.
- No known case of an Invitrogen revenue sharing arrangement

CIRM Grants

How Might We Use Grants?

- Robust platforms for isolation, characterization, expansion and differentiation of stem cells
  - Standardized characterization tools for stem cells and their differentiated progeny (identity, stability, quality & differentiability, etc.)
  - Next generation of AOF media and reagents for stem cell expansion/ differentiation
  - Cryopreservation media and reagents targeted to stem cells
  - Transfection reagents for stem cells

What Benefits might result for the Stem Cell Community?

- Increase range, i.e. number of different stem cell types addressed
- Improve robustness of tools
- Speed … Bring products to the stem cell community faster

Leverage internal investments…accelerate novel tool availability

Thoughts on Terms

- Grantee must retain IP
- Federal policy's emphasis on stimulating research advances and economic development broadly vs. research funding payback has worked well across many research domains
- Payback to CIRM – potential models:
  - Payback to CIRM through "royalty" on products commercialized using IP developed through CIRM funding
  - Matching investment by Commercial Entity in CIRM-funded R&D project
  - Reasonable consideration of manufacturing activities in CA
- Standard 3rd party audit of research and royalties
- Progress Reports
  - ability to protect proprietary information
- Research Use & other IP provisions must preserve a commercial opportunity

Enable SC science… respect IP …ensure payback to CA

Importance of IPPNPO & RUE

- Many more companies will license CIRM-funding technologies from NPs than will seek or accept CIRM grants directly
- IPPNPOs requirements regarding license terms are thus of enormous consequence
  - Will largely determine if research results are commercialized
- CIRM Interim IP Policy for Non Profit Organizations (IPPNPO) contains a Research Use provision that will block all commercialization of any CIRM funded research tools IP:
- requires that CIRM-funded inventions be provided to all “CA research institutions ” “for research purposes” “at “no cost”.

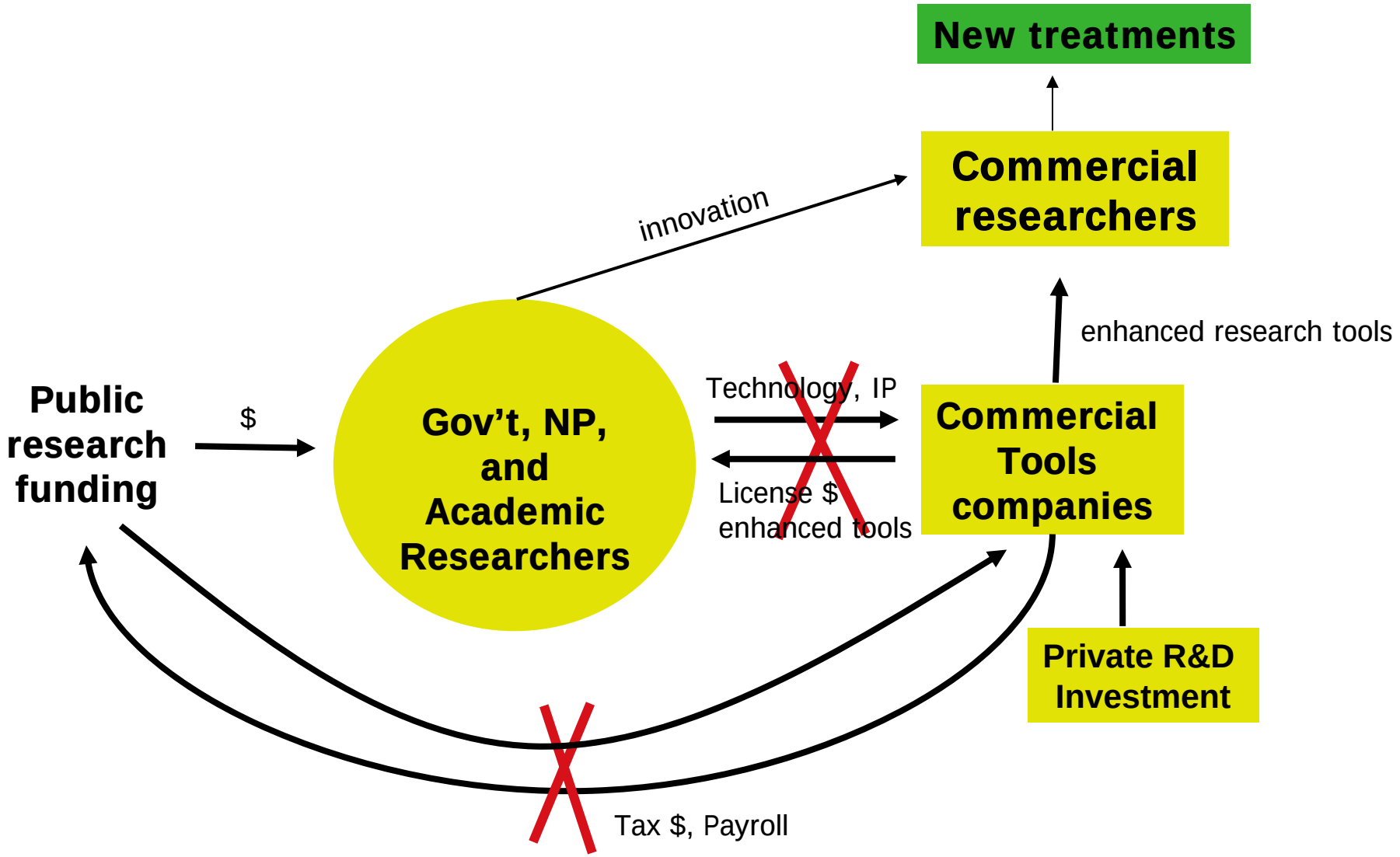
Grantee organizations agree that California research institutions may use their CIRM-funded patented inventions for research purposes at no cost. Grantee organizations shall require the same agreement of each of their licensees of CIRM-funded patented inventions.

Needs to be Fixed in IPPNPO; Not repeated in IPPFPO

Research Use Policy Concerns

- Eliminates the possibility that the commercial sector will help disseminate new research tool technologies since the market is eliminated
  - All CA researchers must be served free
- Therefore limits stem cell research progress
  - New research tools needed for standardization and characterization, as well as to speed and simplify stem cell research.
- Eliminates royalty potential for grantees and the State
  - Research tools a substantial portion of many universities' licenses
- Retards stem cell research
  - Motivates grantees to protect inventions through trade secrets to avoid burdensome requirements
- Creates undue burden on the non profit inventing institutions governed by the policy
- Blows a huge hole in traditional patent practice
  - Commercial firms and commercial research a big stretch

Research Tool Innovation Cycle



Effect of Overbroad Research Use Provisions